

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a minor, municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The discharge results from the operation of a sewage treatment plant at a state correctional facility. This permit action consists of updating the permit to reflect changes in the Water Quality Standards, Guidance Memos, and the VPDES Permit Manual. SIC Code: 9223.

1. **Facility Name:** Virginia DOC - Dinwiddie Correctional Unit #27
Address: 6900 Atmore Drive
Richmond, VA 23261

Location 13510 Cox Road
Church Road, VA 23833
2. **Permit Number** VA0023540
Existing Permit Expiration Date: January 19, 2009
3. **Owner Contact**
Name: Mr. Dallas L. Phillips
Title: Environmental Services Manager
Telephone No: 757-925-2212 ext 5012
4. **Application Complete Date:** September 3, 2008 (fax of temperature data)
Permit Drafted By: Jaime Bauer, Piedmont Regional Office
Reviewed By: Tamira Cohen **Date:** July 22, 2008
Reviewed By: Curt Linderman **Date:** August 13, 2008;
November 3, 2008

Public Notice Dates: First Publication Date: November 19, 2008
Second Publication Date: November 26, 2008
Public Comment Period: November 19, 2008 to December 19, 2008
5. **SCC Certification Verification as required by Section 62.1-44.15:3 of the State Water Control Law:** Applies only to privately owned treatment works. The facility is owned by a state agency.
6. **Financial Assurance/Closure as required by 9 VAC 25-650-10:** Applies only to privately owned treatment works and does not apply to design flows greater than 40,000 gallon per day. While the design is less than 40,000 gallons per day, the facility is owned by a state agency and therefore financial assurance is not required.
7. **Receiving Stream Name:** Unnamed Tributary of Whipponock Creek
Basin: Appomattox River
Section: 5f
Class: III
Special Standards: PWS, NEW-2
River Mile: 2-XGZ000.30
7-Day, 10-Year Low Flows: 0 MGD 0 cfs
1-Day, 10-Year Low Flows: 0 MGD 0 cfs
30-Day, 5-Year Low Flows: 0 MGD 0 cfs
30-Day, 10-Year Low Flows: 0 MGD 0 cfs
7-Day, 10-Year High Flows: 0 MGD 0 cfs
1-Day, 10-Year High Flows: 0 MGD 0 cfs
30-Day, 10-Year High Flows: 0 MGD 0 cfs

1-Q30 Flows 0 MGD 0 cfs
Harmonic Mean Flow: 0 MGD 0 cfs
Tidal: No
On 303(d) List: No
 See Flow Frequency Memo dated July 1, 2008 (Attachment 1)

8. **Operator License Requirements:** Class IV
(9 VAC 25-790-300)

9. **Reliability Class:** Class I
(9 VAC 25-790-70)

10. **Permit Characterization:**

☐ Private ☐ Federal ☒ State ☒ POTW ☐ PVOTW

☐ Possible Interstate Effect ☐ Interim Limits in Other Document

11. **Table 1: Wastewater Flow and Treatment**

Outfall Number	Discharge Source	Treatment	Flow Design Capacity
001	Residential	Septic tank, primary clarifier, flow equalization, Rotating Biological Contactor (RBC), secondary clarifier, tablet chlorination and dechlorination, and cascade post aeration.	0.015 MGD

(See Attachment 2 for facility diagram)

12. **Sewage Sludge Use or Disposal:**

The skimmings and sludge are pumped to an aerobic digester for stabilization, and then pumped to drying beds for dewatering. Once drying occurs equal to a 20% or higher cake, it is hauled for disposal to the Shoosmith Brothers Inc. landfill in Chesterfield County.

13. **Discharge Location Description:**

The facility discharges to an unnamed tributary of Whipponock Creek. The tributary proceeds for approximately 0.30 miles and enters a pond formed from an abandoned rock quarry. The quarry is located next to the Whipponock Creek stream channel. See Attachment 3 for the Church Road Quadrangle topographic map, 70B.

14. **Material Storage:**

Chlorination and dechlorination tablets are stored under roof.

15. **Ambient Water Quality Information:** Due to the intermittent nature of the tributary, effluent data in the Form 2A application and from DMR data were used as ambient water quality data for wasteload calculations and permit limitation development per the advice of J. Palmore, Senior Environmental Engineer Planning Staff.

16. **Antidegradation Review & Comments:** Tier 1 ☒ Tier 2 ☐ Tier 3 ☐

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated

by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. The receiving stream, an UT to Whipponock Creek, is considered to be a Tier 1 water body because it is a dry ditch. This determination is based on the intermittent nature of the stream where beneficial uses cannot be fully attained. The unnamed tributary was not assessed during the 2006 or draft 2008 305(b)/303(d) Water Quality Assessments.

17. **Site Inspection:** See Attachment 7.
18. **Effluent Screening & Limitation Development:**

EFFLUENT CHARACTERISTICS	BASIS FOR LIMITS	DISCHARGE LIMITATIONS					
		MONTHLY AVERAGE		WEEKLY AVERAGE		MIN	MAX
Flow (MGD)	NA	NL		NA		NA	NL
pH (standard units)	1,2	NA		NA		6.0	9.0
BOD ₅	1	24 mg/L	1400 g/d	36 mg/L	2000 g/d	NA	NA
TSS	2	30 mg/L	1700 g/d	45 mg/L	2600 g/d	NA	NA
TRC	1	0.0080 mg/L		0.0098 mg/L		NA	NA
Dissolved Oxygen	1	NA		NA		6.5 mg/L	NA
Ammonia as N (interim)	1	1.7 mg/L		1.7 mg/L		NA	NA
Ammonia as N (final)	1	1.2 mg/L		1.2 mg/L		NA	NA
E. coli	3	126 Geometric Mean		NA		NA	NA

1. Water Quality Based Limit 2. Federal Effluent Guideline 3. Other

Permit limitation development for toxic pollutants began with obtaining flow frequency and stream data from the DEQ water planning staff. Since the facility discharges to an intermittent stream where the effluent is the stream, 100% mix was assumed and used in the MSTRANTI spreadsheet. Effluent data were compiled from DMRs submitted regularly by the facility (Attachment 4). The permittee submitted three and half years of temperature data for use in calculating the WLA for ammonia. See Attachment 8 for analysis of temperature data. The mixing ratios, effluent data, stream data, and flow frequencies were entered into the MSTRANTI spreadsheet to calculate Wasteload Allocations (WLA) for various parameters. The MSTRANTI spreadsheet uses the 90th percentile temperature to calculate the chronic ammonia WLA. The acute WLA for ammonia is not temperature dependent. Since the chronic ammonia standard is based on a 30-day average, it is appropriate to calculate the chronic WLA on the 90th percentile of the monthly average temperature data. Per the advice of the water quality planning staff, effluent data for temperature and pH were used in place of stream data. Hardness for both stream and effluent data was assumed to be 25 mg/L based on a conservative best professional judgment since no other data was available. See Attachment 5 for permit limitation development documents.

pH: A pH range of 6.0 – 9.0 Standard Units is assigned to all Class III waters per the Virginia Water Quality Standards, 9 VAC 25-260-50 and federal effluent limit guidelines for secondary treatment (40 CFR 133.102).

Biological Oxygen Demand (BOD₅): Based on the February 12, 1974 memorandum (Attachment 6). These limitations are more stringent than federal effluent limit guidelines for secondary treatment. The facility has consistently demonstrated compliance at levels well below these limitations.

Total Suspended Solids (TSS): Municipal facilities are required to meet secondary treatment requirements. The February 12, 1974 memorandum (Attachment 6) recommended a TSS limitation of 24 mg/L. However,

based on best professional judgment the TSS limitation is established at 30 mg/L as promulgated in 40 CFR 133, secondary treatment requirements.

Total Residual Chlorine (TRC): A limitation evaluation was conducted for TRC. The chronic and acute WLAs were calculated using the MSTRANTI Excel Spreadsheet. Acute and chronic WLA for TRC were calculated as 0.0019 mg/L and 0.0011 mg/L, respectively. Following the procedures in GM 00-2011, since the WLAa was less than 4.0 mg/L, the actual WLA were entered into STATS.exe to determine the need for a permit limitation and calculate the limitation. A quantification level of 0.10 mg/L and a data point of 20 mg/L were used as recommended by the VPDES permit manual. The evaluation produced recommended limitations of 0.0080 mg/L for average monthly and 0.0096 mg/L for average weekly in order to protect water quality (See Attachment 5). Limitations are the same as in the 2003-2008 permit.

Dissolved Oxygen (DO): Based on the February 12, 1974 Memorandum. See Attachment 6.

Ammonia: A limitation evaluation was conducted for ammonia using the MSTRANTI Excel Spreadsheet to calculate acute and chronic WLAs. The WLAs are entered in to the STATS.exe computer application to determine the need for a permit limitation and calculate the limitation. Acute and chronic WLAs of 3.8 mg/L and 0.57 mg/L, respectively, were entered into STATS.exe with a quantification level of 0.20 mg/L. The procedures established in Virginia DEQ Guidance Memo 00-2011 recommend inputting a single datum point of 9.0 mg/L into the program. The evaluation resulted in a recommended permit weekly and monthly average limitation of 1.2 mg/L. See Attachment 5.

E. coli: The facility received an E. coli wasteload allocation of 2.62×10^{10} cfu/yr in the Appomattox River Basin Bacteria TMDL due to downstream impairment of the Appomattox River. The wasteload allocation is based on the facility's permitted flow of 0.015 MGD and an E. coli count of 126 N/100 mL. The frequency of 2 per Month requires that each sample be separated by at least 7 days.

19. Basis for Sludge Use & Disposal Requirements:

A sludge management plan for the pump and haul disposal of sludge from this facility is required according to 9 VAC 25-31-100 P. Sludge is dried to 20% or higher cake. It is then hauled to Shoosmith Brothers Inc for disposal. No further requirements are applicable.

20. Antibacksliding Statement:

9VAC 25-31-220.L and DEQ Guidance Memo 00-2011 do not allow re-issued permits to contain a less stringent water-quality based effluent limitation, unless under certain specified exceptions.

All limits are at least as stringent as in the previous permit.

21. Compliance Schedules:

Rationale: The VPDES Permit Regulation at 9 VAC 25-31-250 allows for schedules of compliance, when appropriate, which will lead to compliance with the Clean Water Act, the State Water Control Law and regulations promulgated under them.

A more stringent limitation for ammonia is assigned with this reissuance. The facility has four years to demonstrate compliance with the new ammonia limitation. Annual reports of progress will be required each year preceding the final compliance deadline. In addition, the current ammonia limitation of 1.7 mg/L remains effective until the conclusion of the compliance schedule.

22. Special Conditions:

B. Additional Chlorine Limitations and Monitoring Requirements

Rationale: Required by VA Water Quality Standards, 9 VAC 25-260-170 Bacteria: other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate

disinfection.

C.1. 95% Capacity Reopener

Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 2 for all POTW and PVOTW permits.

C.2. CTC, CTO Requirement

Rationale: Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790.

C.3. O&M Manual Requirement

Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9 VAC 25-31-190 E.

C.4. Materials Handling/Storage

Rationale: 9 VAC 25-31-50 A. prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia Section §62.1-44.16 and §62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

C.5. Licensed Operator Requirement

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 C. and the Code of Virginia § 54.1-2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.), require licensure of operators.

C.6. Reliability Class

Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities.

C.7. Sludge Reopener

Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-220 C.4 for all permits issued to treatment works treating domestic sewage.

C.8. TMDL Reopener

Rationale: Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act. This reopener is included in all permits.

C.9. Compliance Reporting

Rationale: Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

C.10. Sludge Use and Disposal

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

C.11. Effluent Monitoring Frequencies

Rationale: Permittees are granted a reduction in monitoring frequency based on a history of permit compliance. To remain eligible for the reduction, the permittee should not have violations related to the effluent limitations for which reduced frequencies were granted. If the permittees fail to maintain the previous level of performance, the baseline monitoring frequencies should be reinstated for those parameters that were previously granted a monitoring frequency reduction.

C.12. Nutrient Enriched Waters Reopener

Rationale: Policy for Nutrient Enriched Waters, 9VAC 25-31-390 A. authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

C.13. Daily Sampling Requirements

Rationale: The prison is being closed and only a skeleton staff will remain on site. There is expected to be little to no flow upon removal of prisoners. Therefore, daily sampling requirements will only apply on days when a discharge occurs.

D. Compliance Schedule

Rationale: The VPDES Permit Regulation at 9 VAC 25-31-250 allows for schedules of compliance, when appropriate, which will lead to compliance with the Clean Water Act, the State Water Control Law and regulations promulgated under them.

The Virginia Water Quality Standards, 9 VAC 25-260, and the corresponding Water Quality Effluent Limitations analyses indicated the need to establish a more stringent effluent limitation for ammonia. As a more stringent effluent limitation, it is appropriate to allow a period of time for the permittee to achieve compliance.

Part II, Conditions Applicable to All Permits

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

23. Changes to the Permit:

Permit Cover Page:							
Item		RATIONALE					
Initial paragraph		Updated language to reflect current agency guidance that incorporates the permit application as part of the permit.					
James River (Middle) changed to Appomattox River Basin		Updated river basin name based on revised Water Quality Standards.					
Section 2b Changed to 5f		Updated receiving stream section designation based on Water Quality Standards for the Appomattox River Basin.					
Part I.A.							
Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
	BOD ₅	1/Month	1/Quarter	1.4 kg/d 2.0 kg/d	1400 g/d 2000 g/d	This facility has maintained performance levels that, according to guidance, qualify it for reductions in monitoring	7/08
	TSS	1/Month	1/6 Months	1.7 kg/d 2.6 kg/d	1700 g/d 2600 g/d		

						requirements for BOD ₅ , and TSS. Loading limitations converted from units of kg/d to g/d in accordance with GM06-2016.	
	Ammonia	-	-	1.7 mg/L	1.2 mg/L	Evaluation of ammonia indicated a needed for a more stringent limitation to maintain water quality.	7/08
	E. Coli	-	2/Month	-	126 N/ 100 mL	Bacteria limitation added in accordance with procedures for facilities with a TMDL allocation.	7/08
FROM	TO	RATIONALE					
Part I.A.	Footnote (1)	Updated language to reflect current agency guidance.					
-	Footnote (2)	Added language to reflect current agency guidance.					
-	Footnote (3)	Added language to reflect current agency guidance.					
	Footnote (4)	Added language to reflect current agency guidance.					
	Footnote (5)	Added language to reflect regional guidance.					
	Footnote (6)	Added to clarify monitoring requirements per regional guidance.					
	Footnote (7)	Added to clarify monitoring requirements.					
Part I.A.1	Part I.A.1	Updated language to reflect interim applicability of limitations until end of compliance schedule.					
Part I.A.3	Part I.A.b	No Change					
Part I.A.4	Part I.A.c	No Change					
Part I.A.5	Part I.A.d	No Change					
-	Part 1.A.2	Final Part I.A. page added to include more stringent ammonia limitations that become applicable after end of compliance schedule.					
Special Condition Changes:							
FROM	TO	RATIONALE					
B.1	B	TRC Limitations and Monitoring Requirements: 0.6 mg/L changed to 0.60 mg/L to reflect significant digit guidance.					
B.2	Removed	Bacterial Limitations and Monitoring Requirements: Facility performed bacterial (E. coli) study establishing chlorination as a surrogate for bacteria monitoring and submitted data to DEQ for review in September 2004, and documented a satisfactory demonstration. However, the demonstration study results were superseded by the need to include an e-coli limitation in conformance with the bacteria TMDL permitting requirements.					
C.1	C.1	95% Capacity Reopener: No Change					
--	C.2	CTC, CTO Requirement: New condition. Added to reflect current agency guidance.					

C.2	C.3	Operations and Maintenance Manual Requirement: Updated language to reflect current agency guidance.
C.3	C.4	Materials Handling/Storage: No Change
C.5	C.5	Licensed Operator Requirement: No Change
C.4	C.6	Reliability Class: No Change
C.6	C.7	Sludge Reopener: No Change
--	C.8	TMDL Reopener: New condition. Added to reflect current agency guidance.
C.9	C.9	Compliance Reporting: Updated language to reflect current agency guidance on compliance reporting and significant digits.
C.7	C.10	Sludge Use and Disposal: Updated language to reflect current agency guidance. Change also reflects transfer of the program from VDH to DEQ.
--	C.11	Effluent Monitoring Frequencies: New condition. Added to reflect facility's eligibility for reduced monitoring frequencies. See Attachment 5 for evaluation.
C.8	C.12	Nutrient Enriched Waters Reopener Updated language to reflect current agency guidance.
	C.13	Daily Sampling Requirements Added to clarify daily monitoring requirements for closed operations.
--	Part I.D.	Schedule of Compliance for Ammonia. Evaluation of ammonia indicated a needed for a more stringent limitation to maintain water quality.

24. Variances/Alternate Limits or Conditions:

- A waiver was granted from the Form 2A application requirement for BOD5 and TSS sampling type. The applicant was allowed to substitute grab samples for 24-hour composite samples based on the qualification that the grab samples are representative of a 24-hour composite.

25. Regulation of Users (9 VAC 25-31-280 B 9):

Not Applicable - The facility is owned by a state agency.

26. Public Notice Information required by 9 VAC 25-31-280 B:

All pertinent information is on file and may be inspected, and copied by contacting:

Ms. Jaime Bauer at:
 Virginia DEQ Piedmont Regional Office
 4949-A Cox Road
 Glen Allen, VA 23060
 Telephone No. (804) 527-5015
 Email Address: jlbauer@deq.virginia.gov

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit

action.

The public may review the draft permit and application at the DEQ Piedmont Regional Office by appointment.

27. Additional Comments:

a. **Previous Board Action:** None

b. **Staff Comments:**

- Permittees having exemplary operations that consistently meet permit requirements are considered for reduced monitoring per the VPDES Permit Manual and in accordance with EPA's "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies" (EPA 833-B-96-001). In order to qualify for reduced monitoring, a facility should not have been issued any Warning Letters, Notice of Violations, or Notices of Unsatisfactory Laboratory Evaluations, or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years. The facility was not issued any enforcement related documents in the previous three years.

In order to determine if the permittee qualifies for reduced monitoring frequencies, the three year composite average concentration is calculated for the discharge for most parameters based on the DMR data. See Attachment 4. All concentration data below QL was treated as zero for purposes of determining reduced monitoring eligibility. The composite average is compared to the permit limitation to calculate a ratio of the average to limitation. Using the ratio and the baseline monitoring frequency as determined in the Sampling Schedule Table in the VPDES Manual Section MN-2 A.3, reductions in monitoring frequencies are determined by the Reduction Monitoring Frequency table in VPDES Manual Section MN-2 A.6.b.

The following parameters were evaluated for reduced monitoring frequencies: pH, BOD₅, TSS, DO, and ammonia. To ensure aquatic life and human health, disinfection and dechlorination parameters are not eligible for reduced monitoring.

Reduced monitoring was not granted for pH or DO. Based on DMR data from the past 3 years, the effluent pH was within 0.5 units of the minimum or maximum permit limit on several occasions. Reduced monitoring was not granted for DO because based on DMR data from the past 3 years the reported amount was within 0.5 to 1.0 mg/L of the permit limit on several occasions.

Reduced monitoring was granted for TSS and BOD₅. Baseline monitoring for both parameters is once per month. Review of the 3 year average to permit limit ratios allow TSS monitoring to be reduced to once per six months and the BOD₅ to be reduced to once per quarter.

Ammonia was eligible and evaluated for reduced monitoring frequency. However, because the 3 year average to permit limit ratio was greater than 50%, the recommended reduced monitoring frequency listed in Section MN-2 A.6.b. of the permit manual was the same as the baseline monitoring frequency. Also, it is inappropriate to reduce monitoring for ammonia because the effluent limitation is being reduced with this permit re-issuance. Therefore, there is no reduction in monitoring frequency for ammonia.

c. **Public Comment:** No comment received.

28. 303(d) Listed Segments (TMDL):

The facility discharges directly to an UT of Whipponock Creek that was not assessed during the 2006 or draft 2008 305(b)/303(d) Water Quality Assessments. However, the facility received an E. coli wasteload allocation of 2.62E+10 cfu/yr in the Appomattox River Basin Bacteria TMDL due to downstream impairment of the Appomattox River. The wasteload allocation is based on the

facility's permitted flow of 0.015 MGD and an E. coli count of 126 N/100 mL. EPA approved the TMDL on August 30, 2004 and the SWCB approved it on December 20, 2005. The permit includes an effluent E. coli limitation of 126 N/mL in order to meet the TMDL wasteload allocation.

29. Summary of Attachments:

1. Flow Frequency Memorandum
2. Facility Diagram
3. Topographic Map
4. Discharge Monitoring Report (DMR) Data
5. Permit Limit Development
6. February 12, 1974 Memorandum
7. Site Visit Memorandum
8. Temperature Data Analysis


Attachment 1 – Flow Frequency Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
VDOC Dinwiddie Correctional Unit #27 – VA0023540

TO: Jaime Bauer

FROM: Jennifer V. Palmore 

DATE: July 1, 2008

COPIES: File

The Virginia Department of Corrections - Dinwiddie Correctional Unit #27's sewage treatment plant discharges to an unnamed tributary of Whipponock Creek near Church Road, VA. Stream flow frequencies have been requested for this site for use in developing effluent limitations for the VPDES permit.

At the discharge point, the receiving stream is shown to be an intermittent stream on the USGS Church Road Quadrangle topographic map. The flow frequencies for intermittent streams are shown below.

Unnamed tributary at discharge point:

1Q30 = 0.0 cfs	High Flow 1Q10 = 0.0 cfs
1Q10 = 0.0 cfs	High Flow 7Q10 = 0.0 cfs
7Q10 = 0.0 cfs	High Flow 30Q10 = 0.0 cfs
30Q10 = 0.0 cfs	HM = 0.0 cfs
30Q5 = 0.0 cfs	

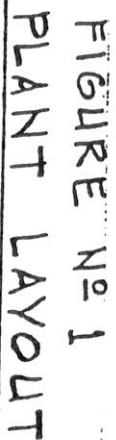
The stream proceeds approximately 0.30 miles and enters a pond caused by an abandoned rock quarry. The quarry is located next to the stream channel for Whipponock Creek. Due to its intermittent nature the tributary has been considered a Tier 1 water. I recommend that effluent temperature, pH, and hardness be used in calculating permit limits. The rivermile for the discharge is 2-XGZ000.30.

The receiving stream was not assessed during the 2006 or draft 2008 305(b)/303(d) Water Quality Assessments. However, the facility received a wasteload allocation in the Appomattox River Basin Bacteria TMDL due to a downstream impairment on the Appomattox River. The facility received an average annual E. coli wasteload allocation of 2.62E10 cfu/year based on a permitted flow of 0.015 MGD.

If you have any questions concerning this analysis, please let me know.

Attachment 2 - Facility Diagram

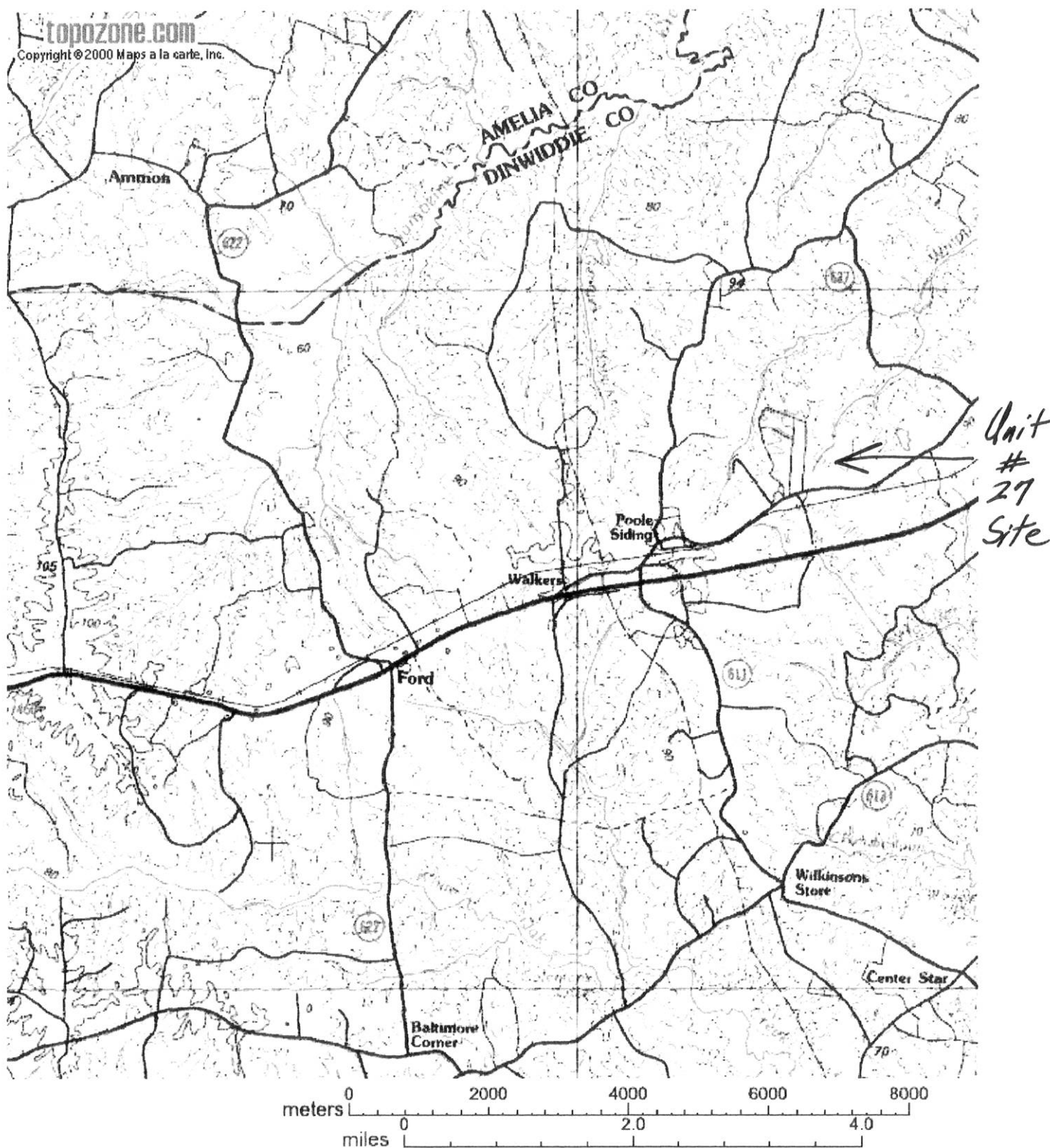
DECHLORINATION TANK



ESU DINWIDDIE CORRECTIONAL UNIT #27
WASTEWATER TREATMENT PLANT
RBC

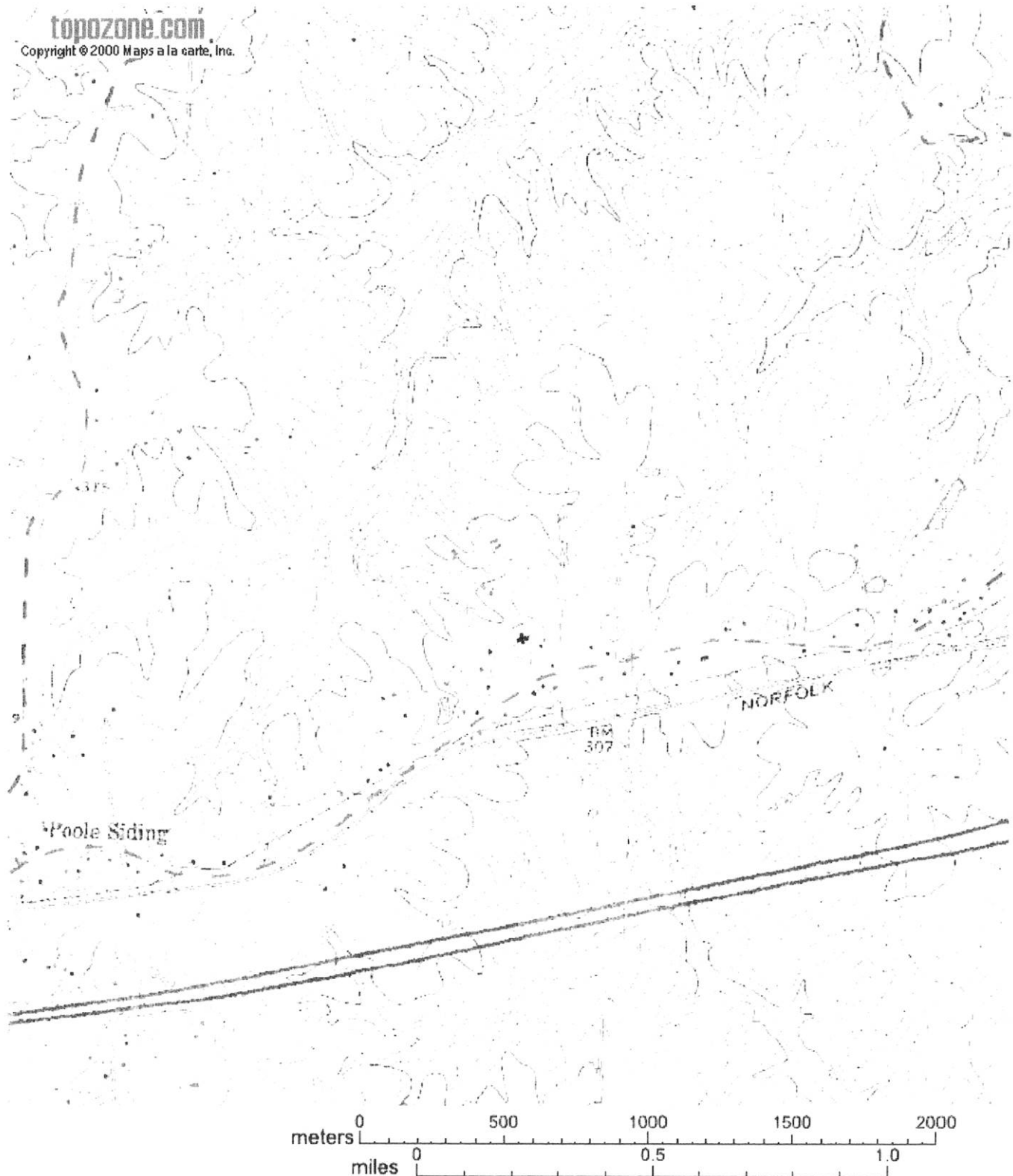
The influent flows into an (1) old existing two compartment septic tank. The principle function of the septic tank is the removal of large solids and dense particulate matter, which will reduce the solids loading on the downstream treatment units and to provide some anaerobic digestion of the raw sludge. Flow goes from here to the (2) primary clarifier. The solids loading on the primary clarifier is expected to be very low. The relatively quiescent state present in this unit should provide excellent removal of remaining solids. The object of the primary clarifier is to remove the settleable solids from the waste stream. The solids will settle to the hopper bottom where they can be periodically pumped to the digester. Flow goes from here to the (3) flow equalization basins. There are two EQ tanks present. They handle variations in wastewater flows to provide a constant load in the downstream treatment units. Flow goes from here to the (4) RBC Unit. The RBC process is a secondary, biological wastewater treatment system. It consist of a large-diameter corrugated plastic media mounted in a horizontal shaft and placed in a concrete tank. The media is slowly rotated by air pressure while approximately 40% of the surface area, is submerged in the wastewater. The biological population present on the plastic media is responsible for the treatment achieved. Flow goes from here to the (5) secondary clarifier basin. When a liquid containing solid particles is placed in a relatively quiescent state, those particles having a higher specific gravity than the liquid tend to settle. It is the object of this secondary clarifier to remove the suspended solids and deliver them to the digester for further digestion and storage. Flow goes from here to the (6) chlorination tank. Here disinfection takes place. Dual tablet chlorinators are utilized to deliver disinfection. Flow goes from here to (7) dechlorination and then to (8) post aeration which consist of a two chamber cascade structure. Here oxygen is added into the flow before it reaches the (9) plant outfall where the effluent discharge takes place. Skimmings and settled sludge is disposed of in the (10) aerobic digester. Aerobic digestion is the process utilized to stabilize the combination of primary and secondary sludges. This is accomplished by aerating the sludge until it is stable and relatively nuisance free. Only then is it pumped to the (11) sludge drying beds which dewater the solids. When sufficient drying occurs which will equal to a 20% or higher cake, will it be removed by shovel and loaded onto a truck to be transported to Shoosmith Landfill in Chesterfield County for disposal.

Attachment 3 – Topographic Map

TopoZone.comMap center is UTM 18 263646E 4117460N - **CHURCH ROAD** quad [Quad Info]

TopoZone.com

Map center is UTM 18 263653E 4117467N - **CHURCH ROAD** quad [[Quad Info](#)]



Attachment 4 – Discharge Monitoring Report (DMR) Data

pH

Received Date	Conc Min	Conc Max
07-Feb-2000	7.4	8.6
06-Mar-2000	6.9	8
06-Apr-2000	7.5	8.1
05-May-2000	7.5	8.3
08-Jun-2000	7.4	8.3
10-Jul-2000	7.8	8.2
03-Aug-2000	7.4	8.1
08-Sep-2000	7.4	7.9
10-Oct-2000	7.4	
06-Nov-2000	7	8
08-Dec-2000	7.8	8.4
08-Jan-2001	7.1	8.4
09-Feb-2001	7.2	8.1
08-Mar-2001	7.4	8.4
06-Apr-2001	7.4	8.2
07-May-2001	6.2	8
08-Jun-2001	7.4	8.1
09-Jul-2001	7.2	8.1
09-Aug-2001	7.3	8.3
07-Sep-2001	7.4	8.3
09-Oct-2001	7.6	8.6
09-Nov-2001	7.4	8.6
10-Dec-2001	7.6	8.4
14-Jan-2002	7.4	8.3
11-Feb-2002	7.2	8.2
11-Mar-2002	7.6	8.3
09-Apr-2002	7.6	8.4
10-May-2002	7.2	8.3
10-Jun-2002	6.7	8.4
11-Jul-2002	6.7	8
09-Aug-2002	7.1	8.1
10-Sep-2002	7.8	8.3
08-Oct-2002	6.8	8.3
07-Nov-2002	7.3	8.5
09-Dec-2002	7.2	8.4
09-Jan-2003	7.5	8.4
10-Feb-2003	7.5	8.4
07-Mar-2003	7.6	8.6
10-Apr-2003	7.6	8.6
08-May-2003	7.4	8.4
05-Jun-2003	7.1	8.3
07-Jul-2003	7.2	8.5
07-Aug-2003	7.5	8.4
09-Sep-2003	7.7	8.4
06-Oct-2003	7.7	8.4
07-Nov-2003	7.6	8.3
05-Dec-2003	7.5	8.3
08-Jan-2004	7.3	8.2
05-Feb-2004	7.2	7.8
09-Mar-2004	7.2	8.1
12-Apr-2004	7.1	8

07-May-2004	7.3	8.4
07-Jun-2004	7.5	8.4
12-Jul-2004	7.7	8.5
06-Aug-2004	7.5	8.5
08-Sep-2004	7.5	8.1
12-Oct-2004	7.4	7.9
05-Nov-2004	7.6	8.1
10-Dec-2004	7	8.1
07-Jan-2005	7.3	7.9
08-Feb-2005	7	7.7
04-Mar-2005	6.9	7.9
07-Apr-2005	6.9	7.7
09-May-2005	6.8	7.8
07-Jun-2005	7.1	8.8
11-Jul-2005	7.2	7.6
08-Aug-2005	7	7.9
06-Sep-2005	7.2	7.6
06-Oct-2005	7.2	7.8
08-Dec-2005	7	7.8
09-Jan-2006	7	7.8
09-Feb-2006	6.9	7.7
06-Mar-2006	6.9	7.7
07-Apr-2006	7.2	7.5
05-May-2006	6.9	7.6
09-Jun-2006	6.8	8.4
10-Jul-2006	7.1	7.6
04-Aug-2006	6.8	7.4
07-Sep-2006	6.5	7.3
06-Oct-2006	6.6	7.1
13-Nov-2006	6.4	7
08-Dec-2006	6.5	7.4
10-Jan-2007	6.5	7
05-Feb-2007	6.5	7.1
06-Mar-2007	6.5	6.9
09-Apr-2007	6.3	6.9
04-May-2007	6.5	7
08-Jun-2007	6.7	7.7
06-Jul-2007	6.6	7.1
03-Aug-2007	6.7	7.1
10-Sep-2007	6.8	7.1
10-Oct-2007	6.7	7.2
09-Nov-2007	6.5	7.5
07-Dec-2007	6.7	7.5
09-Jan-2008	6.5	7.6
04-Feb-2008	6.6	7.2
07-Mar-2008	6.6	7.4
04-Apr-2008	6.7	7.3
07-May-2008	6.4	7.2
06-Jun-2008	6.4	7.6
08-Jul-2008	6.9	7.5

Last 3 Years of Data

2004 Permit Limit:	6.0	9.0
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Average	7.1069307	7.949
90th Percentile	7.6	8.41
10th Percentile	6.5	7.19

Eligible for Reduced Monitoring Frequency:	Yes - case by case
Baseline Monitoring Frequency:	1/Day
Reduced Monitoring Frequency:	1/Day - No reduction***

***Reduction not allowed because several monthly average pH data that falls within 0.5 units of permit limits.

Biological Oxygen Demand (BOD5)

Received Date	Conc Avg	Conc Max
07-Feb-2000	9	9
06-Mar-2000	9	9
06-Apr-2000	11	11
05-May-2000	11	11
08-Jun-2000	15	15
10-Jul-2000	7	7
03-Aug-2000	13	13
08-Sep-2000	7	7
10-Oct-2000	8	8
06-Nov-2000	7	7
08-Dec-2000	11	11
08-Jan-2001	8	8
09-Feb-2001	9	9
08-Mar-2001	13	13
06-Apr-2001	10	10
07-May-2001	7	7
08-Jun-2001	7	7
09-Jul-2001	6.8	6.8
09-Aug-2001	5.8	5.8
07-Sep-2001	9	9
09-Oct-2001	6.1	6.1
09-Nov-2001	7.6	7.9
10-Dec-2001	7.3	7.3
14-Jan-2002	2.1	2.1
11-Feb-2002	7.3	7.3
11-Mar-2002	12.7	12.7
09-Apr-2002	6	6
10-May-2002	4.7	4.7
10-Jun-2002	5	5
11-Jul-2002	5.8	5.8
09-Aug-2002	6.8	6.8
10-Sep-2002	9.9	9.9
08-Oct-2002	5.7	5.7
07-Nov-2002	6.4	6.4
09-Dec-2002	5.8	5.8
09-Jan-2003	8.2	8.2
10-Feb-2003	7.6	7.6
07-Mar-2003	18.5	18.5
10-Apr-2003	7.2	7.5
08-May-2003	2.6	2.6
05-Jun-2003	7.6	7.6
07-Jul-2003	9.2	9.2
07-Aug-2003	5.7	5.7
09-Sep-2003	6.3	6.3
06-Oct-2003	16.3	16.3
07-Nov-2003	7.1	7.1
05-Dec-2003	4	4
08-Jan-2004	16.4	16.4
05-Feb-2004	2.9	2.9
09-Mar-2004	6	6
12-Apr-2004	6	6
07-May-2004	7	7
07-Jun-2004	6	6
12-Jul-2004	5.3	10.6
06-Aug-2004	20.5	20.5
08-Sep-2004	2.2	2.2
12-Oct-2004	8.3	8.3
05-Nov-2004	16.5	16.5
10-Dec-2004	8.9	8.9

Received Date	Conc Avg	Conc Max
07-Jan-2005	6.9	6.9
08-Feb-2005	12.6	12.6
04-Mar-2005	14.4	28.8
07-Apr-2005	3.8	3.8
09-May-2005	5.8	5.8
07-Jun-2005	7.6	7.6
11-Jul-2005	10.9	10.9
08-Aug-2005	8.3	8.3
06-Sep-2005	5.9	5.9
06-Oct-2005	9.5	9.5
08-Dec-2005	21.5	21.5
09-Jan-2006	6.2	6.2
09-Feb-2006	4.3	4.3
06-Mar-2006	2.7	2.7
07-Apr-2006	19.1	19.1
05-May-2006	11.7	11.7
09-Jun-2006	10.9	10.9
10-Jul-2006	6.8	6.8
04-Aug-2006	7.4	7.4
07-Sep-2006	15	15
06-Oct-2006	8.7	8.7
13-Nov-2006	7.8	7.8
08-Dec-2006	8.6	8.6
10-Jan-2007	6.8	6.8
05-Feb-2007	9.9	9.9
06-Mar-2007	10.4	10.4
09-Apr-2007	0	0
04-May-2007	22.4	22.4
08-Jun-2007	5.9	5.9
06-Jul-2007	6.4	6.4
03-Aug-2007	5.8	5.8
10-Sep-2007	8.4	8.4
10-Oct-2007	5.8	5.8
09-Nov-2007	16.4	16.4
07-Dec-2007	11.7	11.7
09-Jan-2008	16.8	16.8
04-Feb-2008	10.5	10.5
07-Mar-2008	10.7	10.7
04-Apr-2008	5.5	5.5
07-May-2008	9.2	9.2
06-Jun-2008	10.7	10.7
08-Jul-2008	20	20
Average:	8.2898305	8.389830508
3 Year Average:	9.9611111	9.961111111

Last 3 Years of Data

2004 Permit Limit: 24 36 mg/L

Eligible for Reduced Monitoring Frequency:	YES
Baseline Monitoring Frequency:	1/Month
Ratio of 3 yr avg to monthly avg limit:	0.4150463
Reduced Monitoring Frequency:	1/quarter

0: Below Quantification Level

Total Suspended Solids (TSS)

Received Date	Conc Avg	Conc Max
07-Feb-2000	3	3
06-Mar-2000	6	6
06-Apr-2000	6	6
05-May-2000	6	6
08-Jun-2000	5	5
10-Jul-2000	3	3
03-Aug-2000	3	3
08-Sep-2000	3	3
10-Oct-2000	3	3
06-Nov-2000	3	3
08-Dec-2000	5	5
08-Jan-2001	3	3
09-Feb-2001	4	4
08-Mar-2001	4	4
06-Apr-2001	6	6
07-May-2001	4	4
08-Jun-2001	8.5	8.5
09-Jul-2001	6.9	6.9
09-Aug-2001	4.4	4.4
07-Sep-2001	2.8	2.8
09-Oct-2001	2.9	2.9
09-Nov-2001	6	6
10-Dec-2001	2.8	2.8
14-Jan-2002	2.8	2.8
11-Feb-2002	5.9	5.9
11-Mar-2002	9	9
09-Apr-2002	6.1	6.1
10-May-2002	5.5	5.5
10-Jun-2002	3.8	3.8
11-Jul-2002	3.5	3.5
09-Aug-2002	3	3
10-Sep-2002	2.5	2.5
08-Oct-2002	3.3	3.3
07-Nov-2002	2.2	2.2
09-Dec-2002	4	4
09-Jan-2003	5.3	5.3
10-Feb-2003	6.6	6.6
07-Mar-2003	9.1	9.1
10-Apr-2003	3.2	3.2
08-May-2003	6.8	6.8
05-Jun-2003	3.7	4.8
07-Jul-2003	10.6	10.6
07-Aug-2003	4	4
09-Sep-2003	3.5	3.5
06-Oct-2003	4.5	4.5
07-Nov-2003	2.3	2.3
05-Dec-2003	2.1	2.1
08-Jan-2004	5.5	5.5
05-Feb-2004	5.8	5.8
09-Mar-2004	4	4
12-Apr-2004	4	4
07-May-2004	7	7
07-Jun-2004	5	5
12-Jul-2004	18.4	34.7
06-Aug-2004	2	2
08-Sep-2004	3.4	3.4
12-Oct-2004	2.4	2.4
05-Nov-2004	4.3	4.3
10-Dec-2004	8.9	8.9
07-Jan-2005	5.4	5.4

Received Date	Conc Avg	Conc Max
08-Feb-2005	7.6	7.6
04-Mar-2005	5.7	6.3
07-Apr-2005	4.8	4.8
09-May-2005	4.4	4.4
07-Jun-2005	3.9	3.9
11-Jul-2005	4.4	4.4
08-Aug-2005	2.7	2.7
06-Sep-2005	2.3	2.3
06-Oct-2005	2.7	2.7
08-Dec-2005	9.3	9.3
09-Jan-2006	5	5
09-Feb-2006	5.9	5.9
06-Mar-2006	7.8	7.8
07-Apr-2006	6.6	6.6
05-May-2006	4.7	4.7
09-Jun-2006	5.9	5.9
10-Jul-2006	2	2
04-Aug-2006	5.4	5.4
07-Sep-2006	3.5	3.5
06-Oct-2006	5.6	5.6
13-Nov-2006	4.5	4.5
08-Dec-2006	3.6	3.6
10-Jan-2007	6.5	6.5
05-Feb-2007	6.1	6.1
06-Mar-2007	5.4	5.4
09-Apr-2007	7.8	7.8
04-May-2007	5.6	5.6
08-Jun-2007	2.9	2.9
06-Jul-2007	3.8	3.8
03-Aug-2007	3.3	3.3
10-Sep-2007	4	4
10-Oct-2007	3.7	3.7
09-Nov-2007	2.7	2.7
07-Dec-2007	4.1	4.1
09-Jan-2008	9.5	9.5
04-Feb-2008	6	6
07-Mar-2008	5	5
04-Apr-2008	3	3
07-May-2008	4	4
06-Jun-2008	6.1	6.1
08-Jul-2008	3.3	3.3
Average:	4.845	5.135
3 Year Average:	4.8527778	4.85277778

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2004 Permit Limit: 30 45 mg/L

Eligible for Reduced Monitoring Frequency:	YES
Baseline Monitoring Frequency:	1/Month
Ratio of 3 yr avg to monthly avg limit:	0.16175926
Reduced Monitoring Frequency:	1/6 months

0: Below Quantification Level

Dissolved Oxygen (DO)

Received Date	Conc Min
07-Feb-2000	8.2
06-Mar-2000	8.2
06-Apr-2000	8
05-May-2000	8.2
08-Jun-2000	6.6
10-Jul-2000	7
03-Aug-2000	6.8
08-Sep-2000	7
10-Oct-2000	6.8
06-Nov-2000	7.2
08-Dec-2000	7.8
08-Jan-2001	8
09-Feb-2001	7.4
08-Mar-2001	7.8
06-Apr-2001	8
07-May-2001	8
08-Jun-2001	7
09-Jul-2001	6.6
09-Aug-2001	6.5
07-Sep-2001	6.6
09-Oct-2001	6.8
09-Nov-2001	6.6
10-Dec-2001	7.6
14-Jan-2002	7.4
11-Feb-2002	7.8
11-Mar-2002	7.8
09-Apr-2002	8.4
10-May-2002	7.8
10-Jun-2002	7.4
11-Jul-2002	6.8
09-Aug-2002	6.6
10-Sep-2002	6.8
08-Oct-2002	6.8
07-Nov-2002	7.6
09-Dec-2002	8
09-Jan-2003	8.8
10-Feb-2003	9.2
07-Mar-2003	9.4
10-Apr-2003	8.4
08-May-2003	8.4
05-Jun-2003	7.8
07-Jul-2003	7.2
07-Aug-2003	7
09-Sep-2003	6.8
06-Oct-2003	7.4
07-Nov-2003	8
05-Dec-2003	8
08-Jan-2004	8.8
05-Feb-2004	8.6
09-Mar-2004	8.6
12-Apr-2004	8
07-May-2004	7.8
07-Jun-2004	7
12-Jul-2004	6.9
06-Aug-2004	6.9
08-Sep-2004	6.9
12-Oct-2004	7.2

Received Date	Conc Min
05-Nov-2004	7.2
10-Dec-2004	8
07-Jan-2005	8.2
08-Feb-2005	7.8
04-Mar-2005	8
07-Apr-2005	8.2
09-May-2005	7.6
07-Jun-2005	6.9
11-Jul-2005	6.8
08-Aug-2005	6.5
06-Sep-2005	6.8
06-Oct-2005	6.7
08-Dec-2005	7.9
09-Jan-2006	8.6
09-Feb-2006	7.2
06-Mar-2006	7.9
07-Apr-2006	7.3
05-May-2006	8.1
09-Jun-2006	7.2
10-Jul-2006	6.8
04-Aug-2006	6.5
07-Sep-2006	6.6
06-Oct-2006	7.5
13-Nov-2006	7.5
08-Dec-2006	7.7
10-Jan-2007	7.8
05-Feb-2007	7.5
06-Mar-2007	8.3
09-Apr-2007	7.6
04-May-2007	7.1
08-Jun-2007	7
06-Jul-2007	6.5
03-Aug-2007	6.6
10-Sep-2007	6.8
10-Oct-2007	6.8
09-Nov-2007	6.7
07-Dec-2007	8
09-Jan-2008	7.7
04-Feb-2008	7.9
07-Mar-2008	8.5
04-Apr-2008	7.6
07-May-2008	6.8
06-Jun-2008	6.9
08-Jul-2008	6.5
Average:	7.561404

2004 Permit Limit:	6.5 mg/L
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Eligible for Reduced Monitoring Frequency:	Yes - case by case
Baseline Monitoring Frequency:	1/Day
Reduced Monitoring Frequency:	1/Day - No reduction***

***No reduction given because several monthly averages of DO are within 0.5 or 1.0 mg/L of the permit limit.
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0: Below Quantification Level

Ammonia

Received Date	Conc Avg	Conc Max
07-Feb-2000	0.8	0.8
06-Mar-2000	0.63	0.63
06-Apr-2000	0.6	0.6
05-May-2000	1	1
08-Jun-2000	0.8	0.8
10-Jul-2000	0.8	0.8
03-Aug-2000	0.7	0.7
08-Sep-2000	0.6	0.6
10-Oct-2000	0.7	0.7
06-Nov-2000	0.8	0.8
08-Dec-2000	0.8	0.8
08-Jan-2001	0.8	0.8
09-Feb-2001	0.6	0.6
08-Mar-2001	0.9	0.9
06-Apr-2001	0.9	0.9
07-May-2001	0.7	0.7
08-Jun-2001	0.6	0.6
09-Jul-2001	0.9	0.9
09-Aug-2001	0.2	0.2
07-Sep-2001	0.8	0.8
09-Oct-2001	0.7	0.7
09-Nov-2001	0.5	0.5
10-Dec-2001	0.7	0.7
14-Jan-2002	0.6	0.6
11-Feb-2002	0.7	0.7
11-Mar-2002	0.6	0.6
09-Apr-2002	0.9	0.9
10-May-2002	0.1	0.1
10-Jun-2002	0.5	0.5
11-Jul-2002	0.1	0.1
09-Aug-2002	0.72	0.72
10-Sep-2002	0.1	0.1
08-Oct-2002	0.6	0.6
07-Nov-2002	0.003	0.003
09-Dec-2002	0.1	0.1
09-Jan-2003	2.1	2.1
10-Feb-2003	1.5	1.5
07-Mar-2003	1.1	1.1
10-Apr-2003	0.4	0.4
08-May-2003	0.4	0.4
05-Jun-2003	1.4	1.4
07-Jul-2003	0.6	0.6
07-Aug-2003	0.7	0.7
09-Sep-2003	0.7	0.7
06-Oct-2003	0.8	0.8
07-Nov-2003	0.8	0.8
05-Dec-2003	0.7	0.7
08-Jan-2004	0.6	0.6
05-Feb-2004	0.9	0.9
09-Mar-2004	1.6	1.6
12-Apr-2004	1.7	1.7
07-May-2004	1.6	1.6
07-Jun-2004	0.8	0.8
12-Jul-2004	0.2	0.2
06-Aug-2004	0.5	0.5
08-Sep-2004	0.7	0.7
12-Oct-2004	0	0
05-Nov-2004	0	0
10-Dec-2004	0	0
07-Jan-2005	0.4	0.4

Received Date	Conc Avg	Conc Max
08-Feb-2005	0.61	0.61
04-Mar-2005	1.52	1.52
07-Apr-2005	1.1	1.1
09-May-2005	0.99	0.99
07-Jun-2005	0.97	0.97
11-Jul-2005	1.31	1.31
08-Aug-2005	0.87	0.87
06-Sep-2005	0.28	0.28
06-Oct-2005	0	0
08-Dec-2005	1.3	1.3
09-Jan-2006	0.98	0.98
09-Feb-2006	0.68	0.68
06-Mar-2006	1.38	1.38
07-Apr-2006	1.14	1.14
05-May-2006	1.21	1.21
09-Jun-2006	0.73	0.73
10-Jul-2006	0.9	0.9
04-Aug-2006	0.5	0.5
07-Sep-2006	1.43	1.43
06-Oct-2006	1.2	1.2
13-Nov-2006	0.6	0.6
08-Dec-2006	1	1
10-Jan-2007	1.01	1.01
05-Feb-2007	0.78	0.78
06-Mar-2007	1.5	2.94
09-Apr-2007	0.52	0.52
04-May-2007	0.71	0.71
08-Jun-2007	0.37	0.37
06-Jul-2007	0.63	0.63
03-Aug-2007	0.99	0.99
10-Sep-2007	0.4	0.4
10-Oct-2007	0.77	0.77
09-Nov-2007	1.05	1.05
07-Dec-2007	0.75	0.75
09-Jan-2008	1.69	1.69
04-Feb-2008	1.11	1.11
07-Mar-2008	1.54	1.54
04-Apr-2008	1.06	1.06
07-May-2008	1.3	1.3
06-Jun-2008	0.57	0.57
08-Jul-2008	0.39	0.39
Average:	0.6958833	0.695883333
3 Year Average:	0.9069444	0.946944444

Last 3 Years of Data

2004 Permit Limit: 1.7 1.7 mg/L

Eligible for Reduced Monitoring Frequency:	YES
Baseline Monitoring Frequency:	1/Month
Ratio of 3 yr avg to monthly avg limit:	0.5334967
Reduced Monitoring Frequency:	1/Month - No Reduction

0: Below Quantification Level

Chlorine

	005-Total Cl	157 - Total Contact	216 CL2, INST
09-Mar-2004	0	1.8	1.8
12-Apr-2004	0	1.9	1.9
07-May-2004	0	1.8	1.8
07-Jun-2004	0	1	1
12-Jul-2004	0	1.3	1.3
06-Aug-2004	0	1.5	1.5
08-Sep-2004	0	1.5	1.5
12-Oct-2004	0	1.6	1.6
05-Nov-2004	0	1.7	1.7
10-Dec-2004	0	1.6	1.6
07-Jan-2005	0	1.5	1.5
08-Feb-2005	0	1.3	1.3
04-Mar-2005	0	1	1
07-Apr-2005	0	1.6	1.6
09-May-2005	0	1.5	1.5
07-Jun-2005	0	1.8	1.8
11-Jul-2005	0	1.5	1.5
08-Aug-2005	0	2	2
06-Sep-2005	0	1.8	1.8
06-Oct-2005	0	1.9	1.9
08-Dec-2005	0	2.1	2.1
09-Jan-2006	0	2.5	2.5
09-Feb-2006	0	1.5	1.5
06-Mar-2006	0	1.6	1.6
07-Apr-2006	0	1.7	1.7
05-May-2006	0	2.2	2.2
09-Jun-2006	0	1.7	1.7
10-Jul-2006	0	1.8	1.8
04-Aug-2006	0	1.6	1.6
07-Sep-2006	0	1.6	1.6
06-Oct-2006	0	2.1	2.1
13-Nov-2006	0	2.4	2.4
08-Dec-2006	0	1.6	1.6
10-Jan-2007	0	2	2
05-Feb-2007	0	1.5	1.5
06-Mar-2007	0	1.5	1.5
09-Apr-2007	0	1.9	1.9
04-May-2007	0	1.7	1.7
08-Jun-2007	0	2	2
06-Jul-2007	0	1.6	1.6
03-Aug-2007	0	1.6	1.6
10-Sep-2007	0	2.4	2.4
10-Oct-2007	0	3	3
09-Nov-2007	0	2.1	2.1
07-Dec-2007	0	2	2
09-Jan-2008	0	1.6	1.6
04-Feb-2008	0	1.5	1.5
07-Mar-2008	0	1.5	1.5
04-Apr-2008	0	1.7	1.7
07-May-2008	0	1.8	1.8
06-Jun-2008	0	1.9	1.9
08-Jul-2008	0	1.9	1.9
Average:	0	1.75384615	1.753846154

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2004 Permit Limit:	0.0080	0.0098 mg/L
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Eligible for Reduced Monitoring Freq:	NO
Disinfection and dechlorination parameters not eligible for reduced monitoring to ensure protection of aquatic life and human health.	

0: Below Quantification Level

Attachment 5 – Permit Limits Development

MSTRANTI DATA SOURCE REPORT

VA0023540 –Dinwiddie Correctional Unit #27

Stream Information:	
Mean Hardness	Same as effluent as recommended by planning staff. See Flow Frequency Memo dated July 1, 2008 (Attachment 1).
90% Temperature	
90% Maximum pH	
10% Maximum pH	
Tier Designation	As advised by planning unit. See Flow Frequency Memo dated July 1, 2008 (Attachment 1).
Stream Flows:	
All Data	Discharge to intermittent stream. See Flow Frequency Memo dated July 1, 2008 (Attachment 1).
Mixing Information:	
Flow Analysis	100% Mix because all flow is from effluent.
Effluent Information:	
Mean Hardness	BPJ. Effluent data not available. Used conservative assumption.
90% Temperature	Temperature data submitted by permittee (Attachment 8)..
90% Maximum pH	DMR data
10% Maximum pH	
Discharge Flow	Design Flow as reported in Permit Application Form 2A.

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Dinwiddie Correctional Unit #27

Permit No.: VA0023540

Receiving Stream: UT to Whipponock Creek

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information			Stream Flows			Mixing Information			Effluent Information							
Mean Hardness (as CaCO3) =			1Q10 (Annual) =			Annual - 1Q10 Mix =			Mean Hardness (as CaCO3) =							
90% Temperature (Annual) =			7Q10 (Annual) =			- 7Q10 Mix =			90% Temp (Annual) =							
90% Temperature (Wet season) =			30Q10 (Annual) =			- 30Q10 Mix =			90% Temp (Wet season) =							
90% Maximum pH =			1Q10 (Wet season) =			Wet Season - 1Q10 Mix =			90% Maximum pH =							
10% Maximum pH =			30Q10 (Wet season)			- 30Q10 Mix =			10% Maximum pH =							
Tier Designation (1 or 2) =			30Q5 =						Discharge Flow =							
Public Water Supply (PWS) Y/N? =			Harmonic Mean =													
Trout Present Y/N? =			Annual Average =													
Early Life Stages Present Y/N? =																
Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Acenaphthene	0	--	--	1.2E+03	2.7E+03	--	--	1.2E+03	2.7E+03	--	--	--	--	--	--	1.2E+03
Acrolein	0	--	--	3.2E+02	7.8E+02	--	--	3.2E+02	7.8E+02	--	--	--	--	--	--	3.2E+02
Acrylonitrile ^c	0	--	--	5.9E-01	6.6E+00	--	--	5.9E-01	6.6E+00	--	--	--	--	--	--	5.9E-01
Aldrin ^c	0	3.0E+00	--	1.3E-03	1.4E-03	3.0E+00	--	1.3E-03	1.4E-03	--	--	--	--	3.0E+00	--	1.3E-03
Ammonia-N (mg/l) (Yearly)	0	3.81E+00	5.67E-01	--	--	3.8E+00	5.7E-01	--	--	--	--	--	--	3.8E+00	5.7E-01	--
Ammonia-N (mg/l) (High Flow)	0	3.81E+00	1.27E+00	--	--	3.8E+00	1.3E+00	--	--	--	--	--	--	3.8E+00	1.3E+00	--
Anthracene	0	--	--	9.6E+03	1.1E+05	--	--	9.6E+03	1.1E+05	--	--	--	--	--	--	9.6E+03
Antimony	0	--	--	1.4E+01	4.3E+03	--	--	1.4E+01	4.3E+03	--	--	--	--	--	--	1.4E+01
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	3.4E+02	1.5E+02	1.0E+01	--	--	--	--	--	3.4E+02	1.5E+02	1.0E+01
Barium	0	--	--	2.0E+03	--	--	--	2.0E+03	--	--	--	--	--	--	--	2.0E+03
Benzene ^c	0	--	--	1.2E+01	7.1E+02	--	--	1.2E+01	7.1E+02	--	--	--	--	--	--	1.2E+01
Benzidine ^c	0	--	--	1.2E-03	5.4E-03	--	--	1.2E-03	5.4E-03	--	--	--	--	--	--	1.2E-03
Benzo (a) anthracene ^c	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	4.4E-02
Benzo (b) fluoranthene ^c	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	4.4E-02
Benzo (k) fluoranthene ^c	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	4.4E-02
Benzo (a) pyrene ^c	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	4.4E-02
Bis(2-Chloroethyl) Ether	0	--	--	3.1E-01	1.4E+01	--	--	3.1E-01	1.4E+01	--	--	--	--	--	--	3.1E-01
Bis(2-Chloroisopropyl) Ether	0	--	--	1.4E+03	1.7E+05	--	--	1.4E+03	1.7E+05	--	--	--	--	--	--	1.4E+03
Bromoform ^c	0	--	--	4.4E+01	3.6E+03	--	--	4.4E+01	3.6E+03	--	--	--	--	--	--	4.4E+01
Butylbenzylphthalate	0	--	--	3.0E+03	5.2E+03	--	--	3.0E+03	5.2E+03	--	--	--	--	--	--	3.0E+03
Cadmium	0	8.2E-01	3.8E-01	5.0E+00	--	8.2E-01	3.8E-01	5.0E+00	--	--	--	--	--	8.2E-01	3.8E-01	5.0E+00
Carbon Tetrachloride ^c	0	--	--	2.5E+00	4.4E+01	--	--	2.5E+00	4.4E+01	--	--	--	--	--	--	2.5E+00
Chlordane ^c	0	2.4E+00	4.3E-03	2.1E-02	2.2E-02	2.4E+00	4.3E-03	2.1E-02	2.2E-02	--	--	--	--	2.4E+00	4.3E-03	2.1E-02
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	8.6E+05	2.3E+05	2.5E+05	--	--	--	--	--	8.6E+05	2.3E+05	2.5E+05
TRC	0	1.9E+01	1.1E+01	--	--	1.9E+01	1.1E+01	--	--	--	--	--	--	1.9E+01	1.1E+01	--
Chlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	6.8E+02	2.1E+04	--	--	--	--	--	--	6.8E+02

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Chlorodibromomethane ^c	0	--	--	4.1E+00	3.4E+02	--	--	4.1E+00	3.4E+02	--	--	--	--	--	--	4.1E+00
Chloroform ^c	0	--	--	3.5E+02	2.9E+04	--	--	3.5E+02	2.9E+04	--	--	--	--	--	--	3.5E+02
2-Chloronaphthalene	0	--	--	1.7E+03	4.3E+03	--	--	1.7E+03	4.3E+03	--	--	--	--	--	--	1.7E+03
2-Chlorophenol	0	--	--	1.2E+02	4.0E+02	--	--	1.2E+02	4.0E+02	--	--	--	--	--	--	1.2E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	8.3E-02	4.1E-02	--	--	--	--	--	--	8.3E-02	4.1E-02	--
Chromium III	0	1.8E+02	2.4E+01	--	--	1.8E+02	2.4E+01	--	--	--	--	--	--	1.8E+02	2.4E+01	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.6E+01	1.1E+01	--	--	--	--	--	--	1.6E+01	1.1E+01	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	1.0E+02
Chrysene ^c	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	4.4E-02
Copper	0	3.6E+00	2.7E+00	1.3E+03	--	3.6E+00	2.7E+00	1.3E+03	--	--	--	--	--	3.6E+00	2.7E+00	1.3E+03
Cyanide	0	2.2E+01	5.2E+00	7.0E+02	2.2E+05	2.2E+01	5.2E+00	7.0E+02	2.2E+05	--	--	--	--	2.2E+01	5.2E+00	7.0E+02
DDD ^c	0	--	--	8.3E-03	8.4E-03	--	--	8.3E-03	8.4E-03	--	--	--	--	--	--	8.3E-03
DDE ^c	0	--	--	5.9E-03	5.9E-03	--	--	5.9E-03	5.9E-03	--	--	--	--	--	--	5.9E-03
DDT ^c	0	1.1E+00	1.0E-03	5.9E-03	5.9E-03	1.1E+00	1.0E-03	5.9E-03	5.9E-03	--	--	--	--	1.1E+00	1.0E-03	5.9E-03
Demeton	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	1.0E-01	--
Dibenz(a,h)anthracene ^c	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	4.4E-02
Dibutyl phthalate	0	--	--	2.7E+03	1.2E+04	--	--	2.7E+03	1.2E+04	--	--	--	--	--	--	2.7E+03
Dichloromethane	0	--	--	4.7E+01	1.6E+04	--	--	4.7E+01	1.6E+04	--	--	--	--	--	--	4.7E+01
(Methylene Chloride) ^c	0	--	--	2.7E+03	1.7E+04	--	--	2.7E+03	1.7E+04	--	--	--	--	--	--	2.7E+03
1,2-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	4.0E+02	2.6E+03	--	--	--	--	--	--	4.0E+02
1,3-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	4.0E+02	2.6E+03	--	--	--	--	--	--	4.0E+02
1,4-Dichlorobenzene	0	--	--	4.0E+02	2.6E+03	--	--	4.0E+02	2.6E+03	--	--	--	--	--	--	4.0E+02
3,3-Dichlorobenzidine ^c	0	--	--	4.0E-01	7.7E-01	--	--	4.0E-01	7.7E-01	--	--	--	--	--	--	4.0E-01
Dichlorobromomethane ^c	0	--	--	5.6E+00	4.6E+02	--	--	5.6E+00	4.6E+02	--	--	--	--	--	--	5.6E+00
1,2-Dichloroethane ^c	0	--	--	3.8E+00	9.9E+02	--	--	3.8E+00	9.9E+02	--	--	--	--	--	--	3.8E+00
1,1-Dichloroethylene	0	--	--	3.1E+02	1.7E+04	--	--	3.1E+02	1.7E+04	--	--	--	--	--	--	3.1E+02
1,2-trans-dichloroethylene	0	--	--	7.0E+02	1.4E+05	--	--	7.0E+02	1.4E+05	--	--	--	--	--	--	7.0E+02
2,4-Dichlorophenol	0	--	--	9.3E+01	7.9E+02	--	--	9.3E+01	7.9E+02	--	--	--	--	--	--	9.3E+01
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	1.0E+02
1,2-Dichloropropane ^c	0	--	--	5.2E+00	3.9E+02	--	--	5.2E+00	3.9E+02	--	--	--	--	--	--	5.2E+00
1,3-Dichloropropene	0	--	--	1.0E+01	1.7E+03	--	--	1.0E+01	1.7E+03	--	--	--	--	--	--	1.0E+01
Dieldrin ^c	0	2.4E-01	5.6E-02	1.4E-03	1.4E-03	2.4E-01	5.6E-02	1.4E-03	1.4E-03	--	--	--	--	2.4E-01	5.6E-02	1.4E-03
Diethyl Phthalate	0	--	--	2.3E+04	1.2E+05	--	--	2.3E+04	1.2E+05	--	--	--	--	--	--	2.3E+04
Di-2-Ethylhexyl Phthalate ^c	0	--	--	1.8E+01	5.9E+01	--	--	1.8E+01	5.9E+01	--	--	--	--	--	--	1.8E+01
2,4-Dimethylphenol	0	--	--	5.4E+02	2.3E+03	--	--	5.4E+02	2.3E+03	--	--	--	--	--	--	5.4E+02
Dimethyl Phthalate	0	--	--	3.1E+05	2.9E+06	--	--	3.1E+05	2.9E+06	--	--	--	--	--	--	3.1E+05
Di-n-Butyl Phthalate	0	--	--	2.7E+03	1.2E+04	--	--	2.7E+03	1.2E+04	--	--	--	--	--	--	2.7E+03
2,4-Dinitrophenol	0	--	--	7.0E+01	1.4E+04	--	--	7.0E+01	1.4E+04	--	--	--	--	--	--	7.0E+01
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	7.7E+02	--	--	1.3E+01	7.7E+02	--	--	--	--	--	--	1.3E+01
2,4-Dinitrotoluene ^c	0	--	--	1.1E+00	9.1E+01	--	--	1.1E+00	9.1E+01	--	--	--	--	--	--	1.1E+00
Dioxin (2,3,7,8- tetrachlorodibenzo-p-dioxin) (ppq)	0	--	--	1.2E-06	1.2E-06	--	--	1.2E-06	1.2E-06	--	--	--	--	--	--	1.2E-06
1,2-Diphenylhydrazine ^c	0	--	--	4.0E-01	5.4E+00	--	--	4.0E-01	5.4E+00	--	--	--	--	--	--	4.0E-01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	2.2E-01	5.6E-02	1.1E+02	2.4E+02	--	--	--	--	2.2E-01	5.6E-02	1.1E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	1.1E+02	2.4E+02	2.2E-01	5.6E-02	1.1E+02	2.4E+02	--	--	--	--	2.2E-01	5.6E-02	1.1E+02
Endosulfan Sulfate	0	--	--	1.1E+02	2.4E+02	--	--	1.1E+02	2.4E+02	--	--	--	--	--	--	1.1E+02
Endrin	0	8.6E-02	3.6E-02	7.6E-01	8.1E-01	8.6E-02	3.6E-02	7.6E-01	8.1E-01	--	--	--	--	8.6E-02	3.6E-02	7.6E-01
Endrin Aldehyde	0	--	--	7.6E-01	8.1E-01	--	--	7.6E-01	8.1E-01	--	--	--	--	--	--	7.6E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)
Ethylbenzene	0	--	--	3.1E+03	2.9E+04	--	--	3.1E+03	2.9E+04	--	--	3.1E+03	2.9E+04	--	--	3.1E+03
Fluoranthene	0	--	--	3.0E+02	3.7E+02	--	--	3.0E+02	3.7E+02	--	--	3.0E+02	3.7E+02	--	--	3.0E+02
Fluorene	0	--	--	1.3E+03	1.4E+04	--	--	1.3E+03	1.4E+04	--	--	1.3E+03	1.4E+04	--	--	1.3E+03
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.0E+02	--	--	--	5.0E+02	--	--	--	5.0E+02
Guthion	0	--	1.0E-02	--	--	--	1.0E-02	--	--	--	--	1.0E-02	--	--	1.0E-02	--
Heptachlor ^c	0	5.2E-01	3.8E-03	2.1E-03	2.1E-03	5.2E-01	3.8E-03	2.1E-03	2.1E-03	--	--	2.1E-03	2.1E-03	5.2E-01	3.8E-03	2.1E-03
Heptachlor Epoxide ^c	0	5.2E-01	3.8E-03	1.0E-03	1.1E-03	5.2E-01	3.8E-03	1.0E-03	1.1E-03	--	--	1.0E-03	1.1E-03	5.2E-01	3.8E-03	1.1E-03
Hexachlorobenzene ^c	0	--	--	7.5E-03	7.7E-03	--	--	7.5E-03	7.7E-03	--	--	--	--	--	--	7.5E-03
Hexachlorobutadiene ^c	0	--	--	4.4E+00	5.0E+02	--	--	4.4E+00	5.0E+02	--	--	--	--	--	--	4.4E+00
Hexachlorocyclohexane	0	--	--	3.9E-02	1.3E-01	--	--	3.9E-02	1.3E-01	--	--	--	--	--	--	3.9E-02
Alpha-BHC ^c	0	--	--	1.4E-01	4.6E-01	--	--	1.4E-01	4.6E-01	--	--	--	--	--	--	1.4E-01
Hexachlorocyclohexane	0	--	--	1.9E-01	6.3E-01	9.5E-01	--	1.9E-01	6.3E-01	--	--	--	--	9.5E-01	--	1.9E-01
Gamma-BHC ^c (Lindane)	0	9.5E-01	--	2.0E+00	--	--	2.0E+00	--	--	--	--	2.0E+00	--	--	2.0E+00	--
Hexachlorocyclopentadiene	0	--	--	2.4E+02	1.7E+04	--	--	2.4E+02	1.7E+04	--	--	--	--	--	--	2.4E+02
Hexachloroethane ^c	0	--	--	1.9E+01	8.9E+01	--	--	1.9E+01	8.9E+01	--	--	--	--	--	--	1.9E+01
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno (1,2,3-cd) pyrene ^c	0	--	--	4.4E-02	4.9E-01	--	--	4.4E-02	4.9E-01	--	--	--	--	--	--	4.4E-02
Iron	0	--	--	3.0E+02	--	--	--	3.0E+02	--	--	--	--	--	--	--	3.0E+02
Isophorone ^c	0	--	--	3.6E+02	2.6E+04	--	--	3.6E+02	2.6E+04	--	--	--	--	--	--	3.6E+02
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	0.0E+00	--	--	0.0E+00	--
Lead	0	2.0E+01	2.3E+00	1.5E+01	--	2.0E+01	2.3E+00	1.5E+01	--	--	--	2.3E+00	1.5E+01	2.0E+01	2.3E+00	1.5E+01
Malathion	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	1.0E-01	--
Manganese	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	5.0E+01
Mercury	0	1.4E+00	7.7E-01	5.0E-02	5.1E-02	1.4E+00	7.7E-01	5.0E-02	5.1E-02	--	--	--	--	1.4E+00	7.7E-01	5.0E-02
Methyl Bromide	0	--	--	4.8E+01	4.0E+03	--	--	4.8E+01	4.0E+03	--	--	--	--	--	--	4.8E+01
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.0E-02	1.0E+02	--	--	--	3.0E-02	1.0E+02	--	3.0E-02	1.0E+02
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	0.0E+00	--	--	0.0E+00	--
Monochlorobenzene	0	--	--	6.8E+02	2.1E+04	--	--	6.8E+02	2.1E+04	--	--	--	--	--	--	6.8E+02
Nickel	0	5.6E+01	6.3E+00	6.1E+02	4.6E+03	5.6E+01	6.3E+00	6.1E+02	4.6E+03	--	--	6.3E+00	6.1E+02	5.6E+01	6.3E+00	6.1E+02
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.0E+04	--	--	--	--	--	--	--	1.0E+04
Nitrobenzene	0	--	--	1.7E+01	1.9E+03	--	--	1.7E+01	1.9E+03	--	--	--	--	--	--	1.7E+01
N-Nitrosodimethylamine ^c	0	--	--	6.9E-03	8.1E+01	--	--	6.9E-03	8.1E+01	--	--	--	--	--	--	6.9E-03
N-Nitrosodiphenylamine ^c	0	--	--	5.0E+01	1.6E+02	--	--	5.0E+01	1.6E+02	--	--	--	--	--	--	5.0E+01
N-Nitrosodi-n-propylamine ^c	0	--	--	5.0E-02	1.4E+01	--	--	5.0E-02	1.4E+01	--	--	--	--	--	--	5.0E-02
Parathion	0	6.5E-02	1.3E-02	--	--	6.5E-02	1.3E-02	--	--	--	--	1.3E-02	--	6.5E-02	1.3E-02	--
PCB-1016	0	--	1.4E-02	--	--	--	1.4E-02	--	--	--	--	--	--	--	1.4E-02	--
PCB-1221	0	--	1.4E-02	--	--	--	1.4E-02	--	--	--	--	--	--	--	1.4E-02	--
PCB-1232	0	--	1.4E-02	--	--	--	1.4E-02	--	--	--	--	--	--	--	1.4E-02	--
PCB-1242	0	--	1.4E-02	--	--	--	1.4E-02	--	--	--	--	--	--	--	1.4E-02	--
PCB-1248	0	--	1.4E-02	--	--	--	1.4E-02	--	--	--	--	--	--	--	1.4E-02	--
PCB-1254	0	--	1.4E-02	--	--	--	1.4E-02	--	--	--	--	--	--	--	1.4E-02	--
PCB-1260	0	--	1.4E-02	--	--	--	1.4E-02	--	--	--	--	--	--	--	1.4E-02	--
PCB Total ^c	0	--	--	1.7E-03	1.7E-03	--	--	1.7E-03	1.7E-03	--	--	--	--	--	--	1.7E-03

Parameter (ug/l unless noted) ^c	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol ^c	0	1.1E+01	8.1E+00	2.8E+00	8.2E+01	1.1E+01	8.1E+00	2.8E+00	8.2E+01	--	--	--	--	--	--	--	--	1.1E+01	8.1E+00	2.8E+00	8.2E+01
Phenol	0	--	--	2.1E+04	4.6E+06	--	--	2.1E+04	4.6E+06	--	--	--	--	--	--	--	--	--	--	2.1E+04	4.6E+06
Pyrene	0	--	--	9.6E+02	1.1E+04	--	--	9.6E+02	1.1E+04	--	--	--	--	--	--	--	--	--	--	9.6E+02	1.1E+04
Radionuclides (pCi/l except Beta/Photon)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity Beta and Photon Activity (mrem/yr)	0	--	--	1.5E+01	1.5E+01	--	--	1.5E+01	1.5E+01	--	--	--	--	--	--	--	--	--	--	1.5E+01	1.5E+01
Strontium-90	0	--	--	4.0E+00	4.0E+00	--	--	4.0E+00	4.0E+00	--	--	--	--	--	--	--	--	--	--	4.0E+00	4.0E+00
Tritium	0	--	--	8.0E+00	8.0E+00	--	--	8.0E+00	8.0E+00	--	--	--	--	--	--	--	--	--	--	8.0E+00	8.0E+00
Selenium	0	--	--	2.0E+04	2.0E+04	--	--	2.0E+04	2.0E+04	--	--	--	--	--	--	--	--	--	--	2.0E+04	2.0E+04
Silver	0	2.0E+01	5.0E+00	1.7E+02	1.1E+04	2.0E+01	5.0E+00	1.7E+02	1.1E+04	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	1.7E+02	1.1E+04
Sulfate	0	3.2E-01	--	--	--	3.2E-01	--	--	--	--	--	--	--	--	--	--	--	3.2E-01	--	--	--
1,1,2,2-Tetrachloroethane ^c	0	--	--	2.5E+05	--	--	--	2.5E+05	--	--	--	--	--	--	--	--	--	--	--	2.5E+05	--
Tetrachloroethylene ^c	0	--	--	1.7E+00	1.1E+02	--	--	1.7E+00	1.1E+02	--	--	--	--	--	--	--	--	--	--	1.7E+00	1.1E+02
Thallium	0	--	--	8.0E+00	8.9E+01	--	--	8.0E+00	8.9E+01	--	--	--	--	--	--	--	--	--	--	8.0E+00	8.9E+01
Toluene	0	--	--	1.7E+00	6.3E+00	--	--	1.7E+00	6.3E+00	--	--	--	--	--	--	--	--	--	--	1.7E+00	6.3E+00
Total dissolved solids	0	--	--	6.8E+03	2.0E+05	--	--	6.8E+03	2.0E+05	--	--	--	--	--	--	--	--	--	--	6.8E+03	2.0E+05
Toxaphene ^c	0	--	--	5.0E+05	--	--	--	5.0E+05	--	--	--	--	--	--	--	--	--	--	--	5.0E+05	--
Tributyltin	0	7.3E-01	2.0E-04	7.3E-03	7.5E-03	7.3E-01	2.0E-04	7.3E-03	7.5E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	7.3E-03	7.5E-03
1,2,4-Trichlorobenzene	0	4.6E-01	6.3E-02	--	--	4.6E-01	6.3E-02	--	--	--	--	--	--	--	--	--	--	4.6E-01	6.3E-02	--	--
1,1,2-Trichloroethane ^c	0	--	--	2.6E+02	9.4E+02	--	--	2.6E+02	9.4E+02	--	--	--	--	--	--	--	--	--	--	2.6E+02	9.4E+02
Trichloroethylene ^c	0	--	--	6.0E+00	4.2E+02	--	--	6.0E+00	4.2E+02	--	--	--	--	--	--	--	--	--	--	6.0E+00	4.2E+02
2,4,6-Trichlorophenol ^c	0	--	--	2.7E+01	8.1E+02	--	--	2.7E+01	8.1E+02	--	--	--	--	--	--	--	--	--	--	2.7E+01	8.1E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	2.1E+01	6.5E+01	--	--	2.1E+01	6.5E+01	--	--	--	--	--	--	--	--	--	--	2.1E+01	6.5E+01
Vinyl Chloride ^c	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	--	--	--	--	5.0E+01	--
Zinc	0	--	--	2.3E-01	6.1E+01	--	--	2.3E-01	6.1E+01	--	--	--	--	--	--	--	--	--	--	2.3E-01	6.1E+01
	0	3.6E+01	3.6E+01	9.1E+03	6.9E+04	3.6E+01	3.6E+01	9.1E+03	6.9E+04	--	--	--	--	--	--	--	--	3.6E+01	3.6E+01	9.1E+03	6.9E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 20 maximum for industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Metal	Target Value (SSTV)
Antimony	1.4E+01
Arsenic	1.0E+01
Barium	2.0E+03
Cadmium	2.3E-01
Chromium III	1.4E+01
Chromium VI	6.4E+00
Copper	1.5E+00
Iron	3.0E+02
Lead	1.4E+00
Manganese	5.0E+01
Mercury	5.0E-02
Nickel	3.8E+00
Selenium	3.0E+00
Silver	1.3E-01
Zinc	1.4E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

VA0023540 - Dinwiddie Correction Unit 27
STATS.exe Analysis

Chemical = Ammonia - Summer
Chronic averaging period = 30
WLAa = 3.8
WLAc = 0.57
Q.L. = 0.2
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average = 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.1500719532473
Average Weekly Limit = 1.1500719532473
Average Monthly Limit = 1.1500719532473

The data are:

Chemical = Chlorine
Chronic averaging period = 4
WLAa = 0.019
WLAc = 0.011
Q.L. = 0.1
samples/mo. = 30
samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 20
Variance = 144
C.V. = 0.6
97th percentile daily values = 48.6683
97th percentile 4 day average = 33.2758
97th percentile 30 day average = 24.1210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.60883226245855E-02
Average Weekly Limit = 9.8252545713861E-03
Average Monthly Limit = 7.9737131838758E-03

The data are:

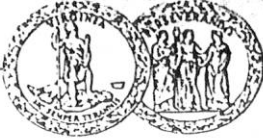
VA0023540 - Dinwiddie Correctional Unit 27
Fact Sheet

Attachment 6 – February 12, 1974 Memorandum

Attachment E
model + printouts

STATE WATER CONTROL

P. O. Box III43, 2111 N. Hamilton St., Richmond, Va. 23230 (804) 770-2241



Please Reply To: *Piedmont Regional Office*
4010 West Broad Street
P. O. Box 6616
Richmond, Virginia 23230
(804) 770-5401



BOARD MEMBERS

Norman M.
Chair
J. Leo B.
Denis J.
Basil T. C.
Ray W. I.
Mrs. Wayne
Andrew W. M.

February 12, 1974

State Department of Health
Division of Engineering
Madison Building
Richmond, Virginia 23219

Re: Dinwiddie County-Sewerage
Field Correctional Unit 27

Attention: Mr. O. H. Adams, Director

Gentlemen:

In accordance with Title 62.1, Chapter 3.1, Article 4, Section 62.1-44.19, Paragraph 2, of the State Water Control Law, we are advising you of the standards of quality and treatment requirements necessary to prevent contravening such standards of water quality.

The proposed discharge into unnamed tributary to Whipponock Creek is listed in Section 6E of the standards for the James River Basin and is classified III B.

Standards

Minimum D.O.:	4.0 mg/l	Daily Average -	5.0 mg/l
pH Range:	6.0-8.5		
Maximum Temperature rise above natural:	5°F		
Maximum Temperature:	90°F		
Coliform Organisms:	Fecal coliforms within a 30-day period not to exceed a log mean of 200/100 ml. Not more than 10% of samples within a 30-day period will exceed 400/100 ml.		

CONTINUED...

Stream Uses - Subclass

Waters generally satisfactory for use as public or municipal water supply, primary contact recreation, propagation of fish and other aquatic life and other beneficial uses.

The staff believes that the proposed sewage treatment facilities will not be adequate to maintain the Water Quality Standards adopted by the Board. In order to maintain Water Quality Standards the following effluent parameters would have to be met:

Monthly Average Flow (max) - 0.024 MGD
Monthly Average BOD₅ (max) - 24 mg/l - 4.8 lbs/day
Monthly Average Suspended Solids (max) - 24 mg/l - 4.8 lbs/day
Dissolved Oxygen (min) - 6.5 mg/l
Chlorine Residual - 2.0 mg/l

In addition to meeting the above technical requirements, the following conditions must also be met:

1. The facility should be approved by the appropriate Planning District Commission.
2. The facility must be approved by Dinwiddie County in accordance with the State Water Control Law Regulation Number 3, a copy of which is enclosed.
3. These facilities will require the following classification C-5 of the State Water Control Board guidelines.

Sincerely,



Roger A. Cooley
Engineer
Piedmont Regional Office

js

cc: Bureau of Applied Technology

Enclosure

Attachment 7 – Site Visit Memorandum



MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Regional Office*

4949-A Cox Road, Glen Allen, Virginia 23060-6295

804/527-5020

TO: File
FROM: Jaime Bauer, Water Permit Writer
DATE: August 18, 2008
SUBJECT: Site Visit VA0023540 – Dinwiddie Correction Unit 27
Cc: Michael Dare, Water Compliance Inspector

On July 1, 2008, a site visit was performed by the permit writer, planning, and Office of Wastewater Engineering staff. We were escorted by Mr. D. L. Phillips, DOC Environmental Services Manager. The plant appeared to be properly operated and maintained. The discharge point is fenced off from the rest of the treatment plant due to cattle fields, but the outfall was observed from a distance. The unnamed tributary was dry until intersecting with the point of discharge.

One bucket each of chlorine and sodium sulfite were sitting uncovered beside the chlorination tank. The facility operators were reminded that those items should be stored under cover. No other concerns were noted. There was no sampling performed or review of onsite records.

Fact Sheet
VA0023540 - DOC Dinwiddie Unit #27

Attachment 8 – Temperature Data

Temperature (degrees C)

	Average	Max
Jan-05	14	18
Feb-05	14	15
Mar-05	15	17
Apr-05	17	21
May-05	20	23
Jun-05	25	28
Jul-05	28	30
Aug-05	28	29
Sep-05	25	27
Oct-05	21	26
Nov-05	18	21
Dec-05	14	16
Jan-06	15	17
Feb-06	14	18
Mar-06	15	19
Apr-06	19	22
May-06	21	25
Jun-06	24	27
Jul-06	26	28
Aug-06	27	29
Sep-06	24	26
Oct-06	20	23
Nov-06	17	20
Dec-06	16	20
Jan-07	15	19
Feb-07	13	16
Mar-07	17	21
Apr-07	19	23
May-07	23	26
Jun-07	26	27
Jul-07	27	28
Aug-07	27	30
Sep-07	25	27
Oct-07	23	26
Nov-07	17	20
Dec-07	16	19
Jan-08	14	18
Feb-08	14	17
Mar-08	16	19
Apr-08	19	22
May-08	21	24
Jun-08	26	28
Jul-08	27	29
Aug-08	27	29
Average	20.20	
90th Per	27	